

Remarks

The present Amendment is in response to the Official Action mailed on July 28, 2005. A Supplemental Information Disclosure Statement accompanies this Amendment. The Official Action rejected claims 1, 3, 7 and 8 under 35 U.S.C. § 102(b) as assertedly being anticipated by the Katz U.S. Patent No. 6,403,397 ("Katz"). The Official Action also rejected claims 4-6 under 35 U.S.C. § 103(a) as assertedly obvious over Katz in view of Laquindanum, Joyce G., Katz, Howard E., Lovinger, Andrew J., and Dodabalapur, Ananth, "Morphological Origin of High Mobility in Pentacene Thin-Film Transistors", Chem. Mater., Vol. 8, pp. 2542-2544 (American Chemical Society 1996) ("Laquindanum"). Claims 2 and 9-18 were objected to as being dependent upon a rejected base claim, but indicated as being allowable if rewritten in independent form. Claims 1, 2, 4-6, 11 and 12 have been amended to be more clear and distinct. Claims 19-26 were withdrawn and are now cancelled without prejudice. New claims 27-34 have been added. Claims 1-18 and 27-34 are presently pending.

The Rejection Under 35 U.S.C. § 102(b)

Claims 1, 3, 7, and 8 stand rejected under 35 U.S.C. § 102(b) as assertedly anticipated by Katz. Applicants respectfully traverse this rejection and request that it now be withdrawn, in view of the above amendments in the claims and the discussion below.

Claim 1 has been amended to be more clear and distinct. Claim 1 now recites a first region of a layer of semiconductor including crystal grains having a first average crystal grain size, and a second region of the layer of semiconductor including crystal grains having a second

average crystal grain size, the first average crystal grain size being substantially different from the second average crystal grain size.

The Official Action cites the Abstract of Katz, which discloses a process for forming devices utilizing patterned organic semiconductor films. The process involves treating a surface to selectively provide regions of greater affinity and lesser affinity for an organic semiconductor or for an organic semiconductor solution. When the organic semiconductor is deposited on the treated surface, either the organic semiconductor dewets from the lesser affinity regions or the resultant film adheres only weakly to the lesser affinity regions such that selective removal is readily performed. Where such removal is not performed, the portions of the organic semiconductor film overlying the greater affinity regions exhibit higher mobility and better film continuity relative to the other portions of the film.

Katz fails to disclose and fails to suggest in its Abstract or elsewhere, as defined in claim 1, a semiconductor apparatus comprising a semiconductor layer having first and second regions respectively including crystal grains having first and second average crystal grain sizes, the first average crystal grain size being substantially different from the second average crystal grain size.

The Official Action acknowledges, at page 3, that Katz fails to disclose conductivity changing with grain size. That acknowledgement understates the shortcomings of Katz as a reference. Katz refers to high mobility as being desirable but makes no mention of "grain size", much less the control of grain size by forming an organic semiconductor on surfaces that influence average crystal grain size.

The Official Action also cites Laquindanum as a reference against claims of the present invention. Laquindanum reports a simultaneous morphological and electrical characterization of

pentacene thin film transistor (“TFT”) films. Laquindanum proposes that high mobility is associated with the macroscopic single-crystal nature of sublimed pentacene films.

Laquindanum, p. 2542 , left column. Laquindanum adds: “We believe that the formation of large single-crystal domains in vacuum-deposited pentacene TFTs and the high degree of molecular ordering that this implies are correlated with the high mobilities obtained from these devices.”

Laquindanum, p. 2544, right column.

Laquindanum and Katz both fail to disclose and fail to suggest a semiconductor apparatus comprising a semiconductor layer having first and second regions respectively including crystal grains having different average crystal grain sizes. Regardless of whether or not there is any motivation to combine these references together, there is no disclosure or suggestion in either of Katz or Laquindanum to provide material layers on which organic semiconductor crystals of increased or decreased average semiconductor crystal grain sizes are generated.

Claims 3, 7 and 8 all depend from claim 1. Claim 10 depends from claim 2 further discussed below; its listing in this rejection is believed to be a typographical error.

The Rejection Under 35 U.S.C. § 103(a)

Claims 4-6 stand rejected under 35 U.S.C. § 103(a) as assertedly obvious over Katz in view of Laquindanum. All of claims 4-6 depend from claim 1, discussed above. Applicants respectfully traverse this rejection and request that it now be withdrawn, in view of the above amendments in the claims and the above discussion of these references.

Allowable Subject Matter

Claims 2 and 9-18 stand objected to as being dependent upon a rejected base claim, but are indicated as being allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

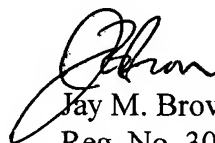
Claim 2 has been accordingly amended to incorporate all of the limitations of claim 1 and is believed to now be in order for allowance. Claims 9 and 10 depend from claim 2. Claim 11 has been amended to depend from claim 2. Claims 13-18 all depend directly or indirectly from claim 2.

Claim 12 has also been accordingly amended to incorporate all of the limitations of claim 1 and is believed to now be in order for allowance.

Conclusion

Since all of the pending claims, as amended, are not anticipated by and are unobvious over the cited references, Applicants believe that this application is now in order for allowance. The Examiner is respectfully requested and invited to contact the undersigned by telephone in order to resolve any remaining issues.

Respectfully submitted,



Jay M. Brown
Reg. No. 30,033
The Eclipse Group
5003 Southpark Drive, Suite 260
Durham, NC 27713
(Tel): (919) 313-6161

Customer No.: 51029